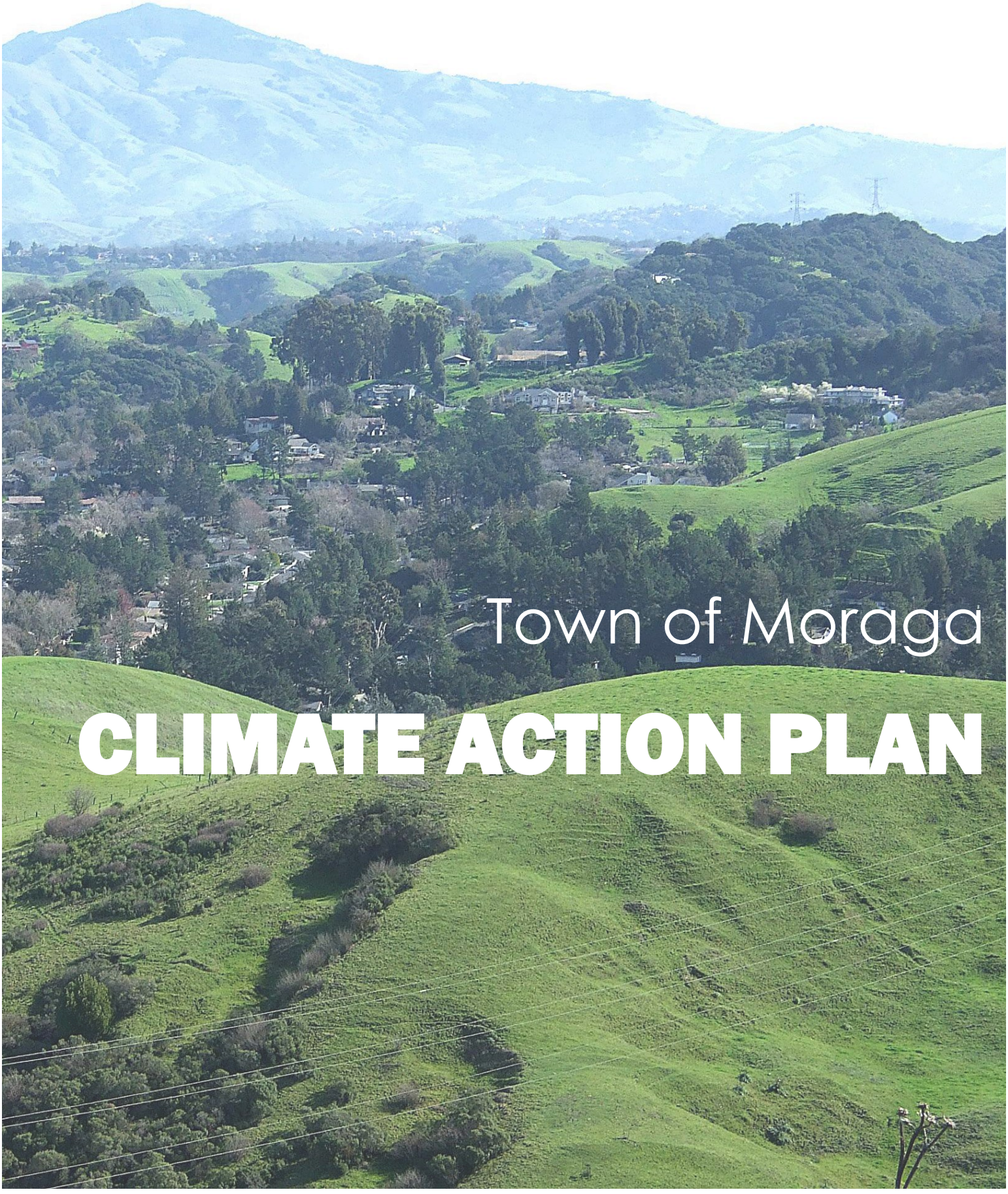

Town of Moraga

# CLIMATE ACTION PLAN

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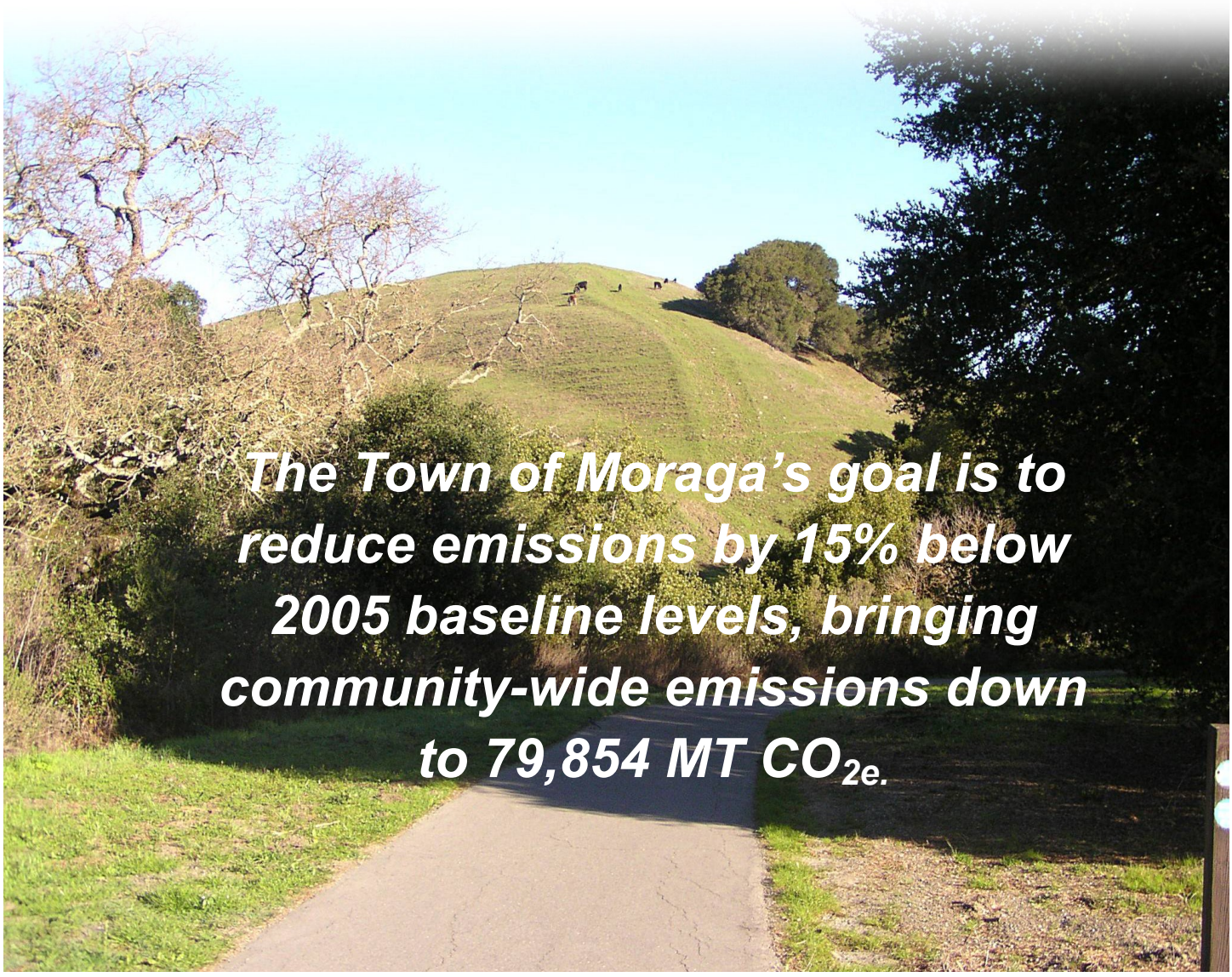
## EXECUTIVE SUMMARY

In 2012, Moraga (Town Council) approved the assembly of a Climate Action Plan Task Force, a citizen's committee tasked with assisting the Town to develop feasible greenhouse gas (GHG) reduction goals and a Climate Action Plan. The Task Force met regularly to develop a number of strategies aimed at reducing emissions by 15% below 2005 levels by 2020.

The Task Force focused on strategies that reflected Moraga's local context and conditions, and reflected practical and feasible ways for the Town to reduce its GHG emissions. The Task Force identified strategies related to five sectors; Land Use and Transportation, Residential and Commercial Energy Use, Solid Waste, Water and Wastewater, and Municipal Operations. Recommended strategies have been included within this Climate Action Plan and demonstrate the Town's commitment to pursuing long-term sustainable emission reductions.


***The Town of Moraga's goal is to reduce emissions by 15% below 2005 baseline levels, bringing community-wide emissions down to 79,854 MT $CO_{2e}$.***

# INTRODUCTION

A Climate Action Plan (CAP) is a long term plan designed to reduce a community's greenhouse gas emissions using a set of strategies. In 2006, the State of California—under the Global Warming Solutions Act (AB 32) — established a long term goal to reduce GHG emissions to 15% below 2005 levels (or the equivalent of 1990 levels) by 2020, and to 80% below 2005 by 2050.

In 2007, the State of California enacted Senate Bill 97, Dutton, an amendment to the California Environmental Quality Act (CEQA) requiring State and local agencies to address greenhouse gas emissions as part of the CEQA process. This law required the Office of Planning and Research (OPR) in conjunction with the Natural Resources Agency to develop guidelines to mitigate GHG emissions.

Although local CAPs are not mandated in California, this legislation has served as an impetus driving many cities to develop their own CAPs. The CEQA guidelines include a provision such that a project consistent with an adopted qualified GHG reduction strategy, such as a Climate Action Plan, can be presumed to not have a significant GHG emission impact. Therefore, a certified CAP allows projects that are typically required to address GHG emission impacts per SB97 through an Environmental Impact Review (EIR) to be streamlined through the CEQA process, provided they are consistent with the Climate Action Plan and are considered not to have additional significant environmental impact. Additionally, in order to be a tierable document, a CAP must be fully implemented or on track to meeting its reduction goals as well as incorporate mandatory strategies as part of its reduction plan.

**Climate Action Planning in Moraga**

Several documents were used to prepare and inform the development of this CAP. Prior to the development of this CAP, the Town completed a municipal and community baseline greenhouse gas emissions inventory for 2005 and an updated community inventory for 2010. In 2013, the Town completed, but did not adopt, an Energy Action Plan (EAP), a long term plan designed to reduce emissions resulting from energy use. Moraga's EAP was designed to be compatible with the Town's General Plan and provided a starting point for many of the strategies in the CAP.

During the development of the EAP, the Town Council created a Climate Action Task Force to develop a Climate Action Plan. The Task Force was comprised of local individuals and property owners with environmental, business, and development backgrounds. Over the course of 18 months, the Task Force met on a regular basis to develop practical and feasible strategies to reduce overall greenhouse gas emissions community-wide. At the end of the Task Force's term, they recommended a final list of strategies for use in the CAP to the Town Council.

The Town then hired a private consulting firm (QuEST) to quantify the emission impacts of the strategies. These strategies are designed to reduce emissions in all major sectors: transportation, residential energy use, commercial energy use, solid waste, water, and wastewater. In addition, this CAP also includes a summary of the community and municipal GHG inventory results, and a forecast of emissions. This CAP, and many of the strategies identified will rely on the active efforts to implement and enforce regulations, pursue grant funding and partnerships with regional and other agencies, and other actions.

## Town Profile

Moraga is located in the western hillsides of Contra Costa County and shares a border with the City of Orinda and the City of Lafayette. Known for its semi rural character, Moraga is surrounded by a natural hillside setting, scenic corridors and native vegetation. Moraga's residential sector is characterized mostly by single family homes with the majority of homes built between 1960 and 1979. In 2005, the Town of Moraga had an estimated population of 16,435. By 2010, Moraga's population had decreased to 16,016.

Moraga's commercial sector is largely comprised of two shopping centers and St. Mary's College. St. Mary's College has more than 2,800 students and is one of the oldest schools in the California. The campus is set on 420 acres, has multiple buildings on its main campus and dormitories. St. Mary's College is an important academic and cultural institution and landmark in the Town.

*Moraga Library, 1500 St. Mary's Road, Moraga*

*In 2011, Moraga completed an energy retrofit of the Town library. This project reduced emissions by 8 metric tons of $CO_2e$.*

## Moraga's Recent Sustainability Efforts

Since 2005, Moraga has participated in legislation and taken action to protect the natural environment. In 2007, Moraga signed onto the U.S. Mayor's Climate Protection Agreement, a local pledge to advance the goals of the Kyoto Protocol by reducing greenhouse gas emissions to 1990 levels. The Town's purchasing policy, which complies with Department of Resources, Recycling and Recovery (CalRecycle)'s Environmentally Preferable Purchases and Practices Policy requirement, aims to decrease waste from consumable materials and encourages the use of pre and post consumer recycled materials.

The Town has completed several projects to reduce its emissions from local government operations by completing energy efficiency projects at its municipal facilities.

In 2008, the windows in the Hacienda facilities were tinted. In 2011, the Town also invested in a series of energy efficiency projects at La Hacienda de las Flores (Hacienda), including insulation, lighting occupancy sensors and an HVAC system. The Town also completed a retrofit at the library, which involved adding insulation, occupancy sensors, and upgrading the space heating boiler. This retrofit helped save the Town 7,080kWh, 1,295 therms and 8 metric tons of $CO_2e$ annually.

Additionally in 2011 and 2012, the Town upgraded many of the parking lot lights. This project included the parking lot lights at the library, Commons Park, Hacienda, and 329 Rheem Blvd. In 2012, the Town completed a lighting retrofit of their streetlights. This action replaced existing streetlights with LED technology.

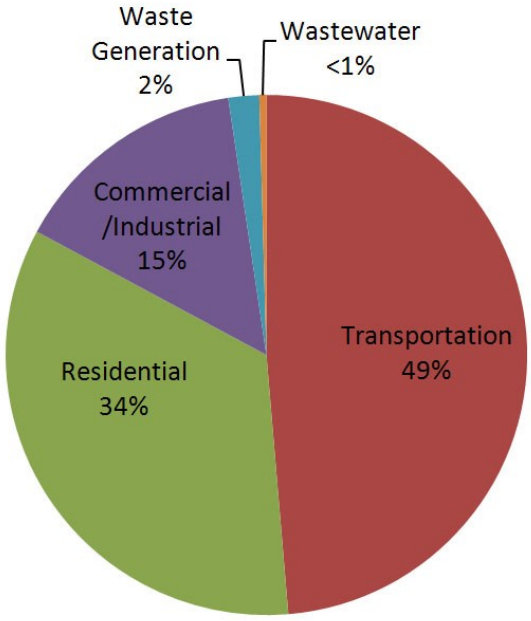
# COMMUNITY-WIDE GHG EMISSIONS (2005)

## Community-Wide Inventory Summary (2005)

The CAP uses 2005 emissions as a "benchmark" for reduction targets. Therefore, the Town quantified these emissions by means of an inventory of various sources and their contribution to the total emissions generated by the Town. Understanding the existing major sources of emissions also helped the Task Force identify activities that are the biggest contributors and strategies most likely to be effective locally.

The inventory includes both a community-wide survey of GHG sources, and a detailed breakdown of a subset of these emissions associated with the Town's municipal operations.

The Town of Moraga emitted approximately 93,945 metric tons of carbon dioxide equivalent (MT $CO_2e$) in the baseline year 2005. The largest contributor to community emissions was the transportation sector which included emissions from vehicles on local roads, and off road equipment. Together these emission sources accounted for approximately 49% of total emissions. The next largest contributor was residential energy use with 34% of total emissions.




*Emissions for municipal operations, 0.5%of community-wide emissions, are included in the five sectors.

The residential sector included emissions from electricity use and natural gas used in Moraga's homes. The commercial sector made up 15% of overall emissions and included electricity and natural gas used by local businesses and schools. Solid waste sent to landfill comprised 2% of emissions followed by wastewater treatment, which accounted for less than 1% of emissions.

**Community-Wide GHG Emissions by Sector, 2005 (MT CO2e)**

| Sector | Activity Data | Unit | MOTC2e |
|---|---|---|---|
| Residential Energy | 47,326,578 | kWh | 10,611 |
| | 4,047,028 | therms | 21,512 |
| Commercial Energy | 28,728,846 | kWh | 7,036 |
| | 1,291,240 | therms | 6,864 |
| Travel on Local Roads | 57,666,351 | VTM | 35,852 |
| Fuel Used by Off-Road Equipment | 957,274 | gallons | 9,861 |
| Solid Waste | 9,480 | tons | 1,730 |
| | 427 | tons of ADC* | 66 |
| Wastewater | 16,435 | population | 413 |
| | | **Total** | **93,945** |

*In 2005, the Town of Moraga emitted 93,945 metric tons of $CO_2e$.*

*Alternate Daily Cover (ADC): cover material placed on surface of the active face of a solid waste landfill at the end of each operating day to control vectors, fires, odors, blowing litter, and scavenging.

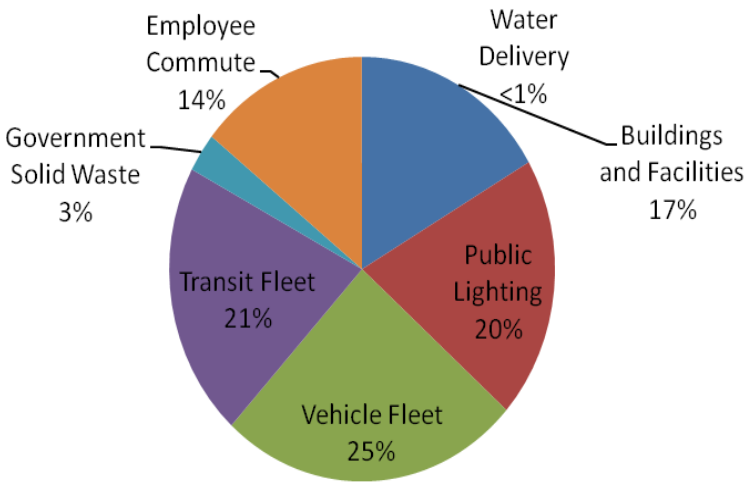
# MUNICIPAL GHG EMISSIONS (2005)

## Municipal Operations

The municipal emissions inventory is a subset of the community inventory. Municipal Operations typically contribute for 1-3% of overall community emissions. In Moraga's case, the municipal sector accounted for 0.5% of community emissions.

In 2005, Moraga's local government operations were responsible for 508 MT of $CO_2e$. The largest source of emissions was the Town's vehicle fleet, accounting for 25% of overall municipal emissions. The next largest source of emissions was the transit fleet, which comprises of ……., with 106 metric tons or 21% of municipal emissions.

Emissions related to energy use in Town buildings contributed 17% of municipal emissions, while emissions related to Town employees commuting to and from work contributed 14% of municipal emissions, that account for 0.5% of community wide emissions. Solid waste sent to landfill and energy used for water distribution contributed the remainder of emissions.




*In 2005, local government operations contributed 508 metric tons of $CO_2e$*

**Municipal GHG Emission by Sector, 2005**

| Sector | $MTCO_2e$ | Percentage |
|---|---|---|
| Buildings | 85 | 17% |
| Public Lighting | 101 | 20% |
| Vehicle Fleet | 128 | 25% |
| Transit Fleet | 106 | 21% |
| Employee Commute | 73 | 14% |
| Government Generated Solid Waste | 15 | 3% |
| Water Delivery | 0.13 | <1% |
| **Total** | **508** | **100%** |

This table shows emissions by municipal activity. There are 7 sectors included in Moraga's 2005 municipal inventory.

# STATE LEGISLATION & EMISSIONS FORECAST

Under the California Global Warming Solutions Act, California has committed to reducing its greenhouse gas emissions by 15% below 2005 levels by 2020. Assembly Bill 32 directs the California Air Resources Board (CARB) to develop a Scoping Plan detailing how these emission reductions will be met. State legislation passed since 2006 include Pavley I, the Renewable Portfolio Standards and the Low Carbon Fuel Standards and are expected to help meet the State's reduction goals. For the purposes of this forecast, only reductions achieved due to the legislation listed above have been taken into account.

**Clean Air Fuel Standards**

Assembly Bill 1493, Pavley I, - requires car manufacturers to reduce GHG emissions from new passenger cars and light trucks. Pavley I took effect for model years between 2009 and 2016. The California Air Resources Board estimated that Pavley standards reduced GHG emissions from new California passenger vehicles by roughly 22% in 2012 and will reduce GHG emissions by about 30% in 2016.

**Low Carbon Fuel Standards (LCFS)**

Executive Order S-1-07, LCFS, is a policy that requires a 10% or greater reduction in the carbon intensity of California's transportation fuels by 2020.

**Renewable Portfolio Standard (RPS)**

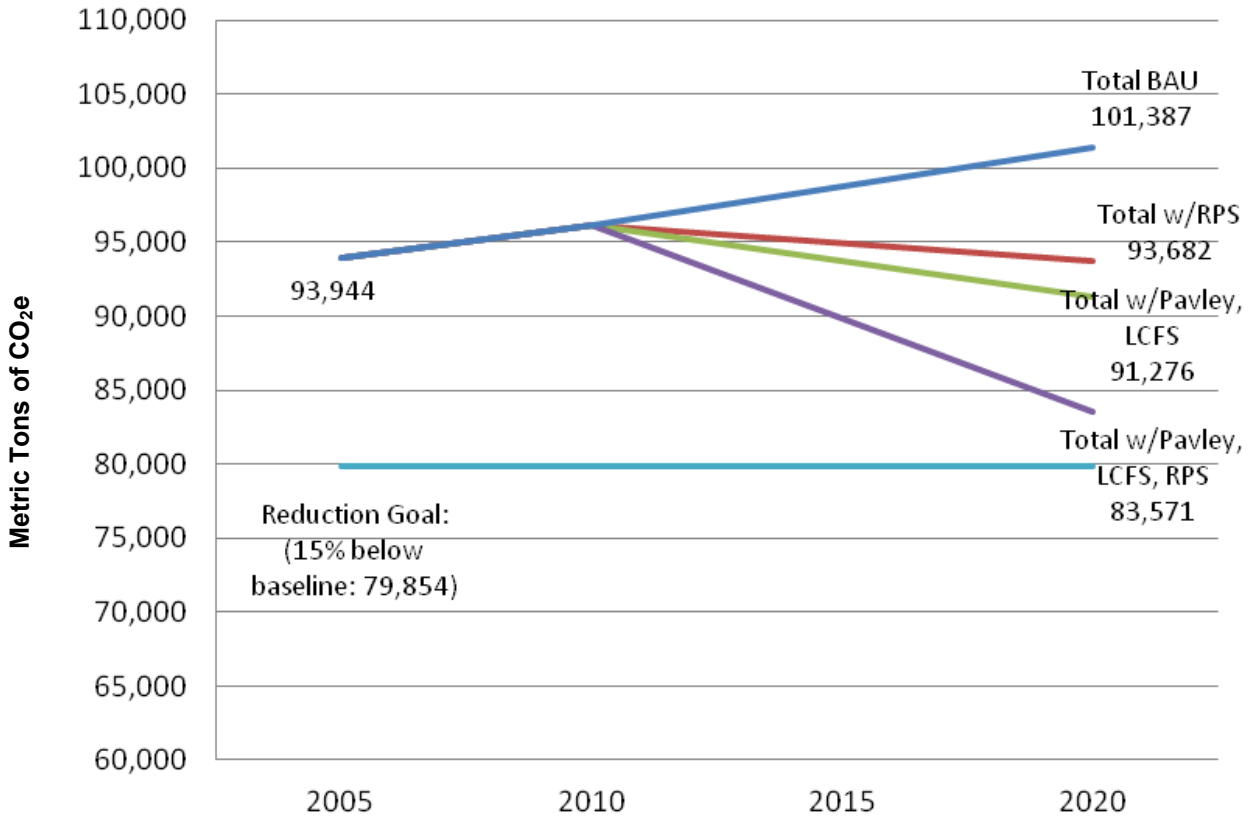
This regulation requires investor-owned utility (IOU) energy providers, such as Pacific Gas and Electric Company, to increase the portion of electricity from eligible renewable sources to 20% by 2010 and to 33% by 2020.

**Business As Usual (BAU) Forecast & Impact on Local Emissions**

The "Business As Usual" (BAU) forecast reflects projected emissions if the Town were to take no actions to control or reduce the generation of GHGs. By 2020, Moraga's emissions (under BAU scenario) are projected to rise to 101,387 MT $CO_2e$. However, State legislation—including Pavley, LCFS and RPS are expected to have a large impact on community-wide emissions. Pavley I is estimated to decrease Moraga's transportation emissions by 7,250 MT $CO_2e$ while LCFS is estimated to reduce emissions by 2,862 MT $CO_2e$ by 2020. The Renewable Portfolio Standards are expected to decrease emissions from the residential, commercial and industrial GHG sectors combined by 7,705 MT $CO_2e$. Altogether, State legislation is expected to reduce local emissions (from BAU) by 17,816 MT $CO_2e$. Emissions reduced under this scenario are referred to as the Adjusted BAU.

*By 2020, Moraga's emissions, under a "business as usual" scenario are projected to rise to 101,387 MT CO2e*

# EMISSIONS FORECAST




## Reduction Targets

The extent of local strategies needed to reach Moraga's 15% reduction target depends on the Town's consideration of emissions reductions from State legislation. The table below shows how State legislation is projected to impact local emissions and the remaining GHG reductions needed to meet Moraga's GHG reduction target.

If estimated state reductions are accounted for and population growth projections are accurate, it is estimated that the Town will need to reduce its emissions by 4% (or 3,716 MT $CO_2e$) to meet its reduction goal (15% below baseline) by 2020. Without accounting for state legislation, emission reductions will need to be much higher (21,533 MT $CO_2e$) in order to achieve the Town's reduction goals by 2020.

**Emissions Forecast and Reduction Targets (MT CO2e)**

| | 2020 |
|---|---|
| **2005 Emissions Baseline** | **93,944** |
| **Adjusted BAU Emissions Forecast by 2020 with State Reductions** | **83,570** |
| **Emissions Reduction Goal (15% below 2005 emissions)** | **79,854** |
| **Local Reduction Needed from Adjusted BAU (MTCO2e)** | **3,716** |

*The Town of Moraga will need to reduce emissions by 3,716 metric tons of $CO_2e$ or 4% of the Town's emissions, to reach its*

# CLIMATE ACTION PLAN STRATEGIES

In order to achieve Moraga's 15% GHG reduction target, more than 40 strategies were identified, assessed and quantified for emission reductions. The Climate Action Task Force considered a comprehensive array of strategies, and from that list, select strategies that were felt to be most relevant to, and feasible for implementation in Moraga. Most of the strategies in the CAP include a range of potential emissions reductions based on different rates of participation or adoption.

Three potential emissions reduction paths have been quantified: Paths I, II and III. Path I represents the lowest participation rates and thus has the smallest GHG reductions. Path III is based on high participation and can potentially achieve the greatest GHG reductions. For the purposes of this CAP, Path I has been selected for all quantified strategies and is estimated to reduce to the Town's emissions by 3,582 to 3,716 MT CO2e, which would, at the upper end of the estimations, meet exactly the Town's 15% reduction target. Each strategy is represented by an alphanumeric symbol (see key below). For a complete breakdown of the quantified strategies, please see page 34.

| Strategy | Key |
|---|---|
| LU&T | Land Use and Transportation |
| EE-RC | Residential and Commercial Energy |
| EE-R | Residential Energy |
| EE-C | Commercial Energy |
| WW | Water and Wastewater |
| SW | Solid Waste |
| M | Municipal Operations |

*Source: Town of Moraga*

# LAND USE & TRANSPORTATION

California has some of the nation's busiest and most congested roads. With transportation emissions accounting for the majority of the State's emissions, as well as those of many of its cities, reducing emissions from this sector presents a significant challenge for local governments and communities.

Like many other cities in California, the transportation sector constitutes the largest source of Moraga's greenhouse gas emissions (approximately 49% in 2005). Most of these emissions came from the daily vehicle miles traveled (DVMT) by passenger cars, light and heavy trucks, and transit buses traveling on Moraga's local roads. The remaining emissions came from off-road vehicles (note: none of these emissions came from state highways).

State legislation, including the Pavely Standards and the Low Carbon Fuel Standards (LCFS) have helped curb current and projected transportation emissions. The California Air Resources Board anticipates that the Pavley Standards--which require car manufacturers to reduce greenhouse gas emissions in new passenger cars and light trucks--will reduce greenhouse gas emissions (GHG) from new California passenger vehicles by roughly 22% in 2012 and 30% in 2016. The State's Low Carbon Fuel Standards require a 10% or greater reduction in the carbon intensity of California's transportation fuels by 2020.

Despite positive impacts from State legislation, transportation emissions are still projected to increase locally and State-wide. Between 2005

*Intersection of Rheem Boulevard and Moraga Road; Source: Town of Moraga*

and 2010, transportation emissions increased by an estimated 7% and according to Moraga's emissions' forecast, transportation emissions are projected to increase by a total of 9% above baseline levels by 2020. In order to achieve Moraga's 15% reductions goal proportionally, the community will need to reduce transportation emissions by 1,820 MT of CO2e.

This chapter includes a combination of strategies that—in addition to reducing emissions—can also provide benefits such as improved air quality, increased physical activity and enhanced mobility for certain segments of the population, such as youth and seniors who might be unable to drive. Strategies aimed at reducing the daily vehicle miles traveled, and reducing single occupancy vehicle trips in particular, will bring about the largest reductions.

Strategies focusing on alternate modes of transportation (biking, walking, and public transit) produce no or many fewer emissions per capita. The strategies included in this chapter are estimated to reduce emissions by 2,308 MT CO2e, which exceeds needed reductions for this sector. The carpool/rideshare program, which included a 20% increase in current ridership, had the largest impact on transportation emissions (2,041 MT of CO2e) mainly due to its effectiveness in reducing vehicle miles travelled.

Although Moraga does not experience the sort of severe congestion experienced by many communities, its high level of out-commuting and short-term congestion associated with school start times, and low-density neighborhoods cause a high degree of car dependency. There is a limited network of bicycle and pedestrian facilities, which tends to discourage walking and biking for local commuter and recreational trips. Even with the State's aggressive transportation plan to reduce emissions using legislation and vehicle technology, reducing local emissions will require a concerted community effort and multi-faceted approach describe herein.

*Source: Town of Moraga*

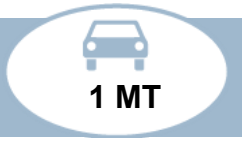
## *STRATEGIES*

### LU&T.1 Increase bike ridership in Moraga by 5% or better

- Identify commercial and public areas that lack appropriate levels of bicycle parking and install the needed facilities, as funding is available.
- Develop and adopt bicycle and pedestrian plan.
- Amend zoning ordinance to require adequate bicycle parking for tenants, employees, and customers in new residential and non-residential development.
- Require new bike paths through all new developments as Conditions of Approval.

*Implementation: Town of Moraga, (ordinance amendment, policies and plans, grants)*

### LU&T.2 Complete Moraga's streets and improve bicycle and pedestrian facilities through road design improvements




- Evaluate and modify major road corridors to enhance traffic flow and to reduce congestion and vehicle idling. Modifications system improvements could include, but would not be limited to, synchronization and optimization of signal timing, multi-modal roadway enhancements, intersection capacity improvements, and construction of roundabouts instead of conventional signals.
- Implement road improvements such as landscape medians and street corner bulb outs to improve pedestrian safety and to reduce greenhouse gas emissions by lowering traffic speeds and improving the pedestrian and bicycle environment.
- Ensure that sidewalks or other bicycle and pedestrian facilities on major roadways are continuous and complete, and implement the Americans with Disabilities Act improvements, such as installation of curb ramps at intersections.
- Require new and redeveloped street designs to be "complete streets" that address the needs of all users–motorists, pedestrians, bicyclists, children, persons with disabilities, seniors and users of public transit–where appropriate.

*Implementation: Town of Moraga*

## LU&T.3 Achieve a 10% reduction in car trips to school or better*

- Work with schools to create trip reduction programs that encourage walking bicycling, carpooling, and public transit use. Specific attention will be placed on expanding the walking school bus programs** throughout the community, where children walk to school in adult supervised and school coordinated groups.
- Expand the Safe Routes to School program to encourage students to use alternative modes of transportation to get to and from school. Focus on infrastructure improvements surrounding schools on Town-maintained streets. Maintaining travel corridors in the transportation network allows pass-through traffic to be separated from local users, which keeps traffic flowing.

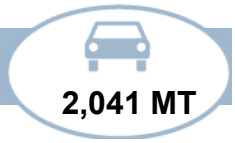
* GHG Reductions from this strategy have already been attributed to community-wide biking, walking, and carpooling strategies. The GHG reductions associated with this strategy have been quantified per the Town's request but are included and not in addition to transportation reductions. **A walking school bus is a group of children walking to school with one or more adults.

## LU&T.4 Support Lamorinda's Connectivity Shuttle Program

- Support Lamorinda Program Management Committee to provide shuttle service between the three Lamorinda central business areas, the Lafayette and Orinda BART stations and Saint Mary's College, and to develop a non-fixed route transit option.
- Conduct outreach to Moraga residents and employers around the benefits and convenience of the Shuttle Program.

*Implementation: Town of Moraga, Lamorinda Program Management Committee*

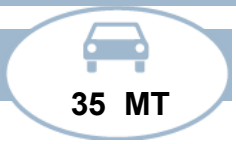
## LU&T.5 Work with the CCTA to implement a carpool/rideshare program




- Participate in Contra Costa Transportation Authority's (CCTA) Real Time Ridesharing (RTR) program that uses a smartphone application to connect people with similar commutes can find each other and create effective car pools.
- Amend the zoning ordinance to allow car sharing companies, with the approval of the property owner, to designate spaces in public parking areas and multi-family housing projects.

*Implementation: Town of Moraga (ordinance amendment); Contra Costa Transportation Authority (partner)*

## LU&T.6 Support the transition to hybrids and alternative fuel vehicles




- Require all new development to pre-wire for electric vehicle charging stations.
- Provide residents with information on rebates and incentives for alternative fuel vehicles.
- Consider installing electric vehicle charging stations at Town facilities and in municipal parking lots, and encourage the installation of stations by businesses and large employers.
- Encourage the Lamorinda School Bus program to purchase Compressed Natural Gas Vehicles for its fleet.

*Implementation: Town of Moraga (ordinance, outreach), Lamorinda School Bus program (partner)*

## LU&T.7 Increase employer participation in Transportation Demand Management programs

- Require new residential and non-residential development to develop a transportation demand management plan and ongoing program that provides incentives to individuals to utilize alternative means of transportation, including biking, walking, carpooling and transit
- Through education and outreach, encourage existing employers to provide transit subsidies, bicycle facilities, alternative work schedules, ridesharing, telecommuting and work-at-home programs, and preferential parking for carpools/vanpools to reduce vehicle miles traveled.

*Implementation: Town of Moraga (ordinance, outreach), local businesses (partner)*

## LU&T.8 Encourage and allow individuals to raise food at home and in community gardens (e.g. vegetable gardens, orchard trees, and chickens) keeping with the Town's semi-rural character.

- Work with community groups and local farmer's markets to host gardening workshops and inform residents on raising their own food.
- Town will need to amend zoning ordinance regulations on keeping chickens and live-stock.

*Implementation: Town of Moraga (ordinance)*

# RESIDENTIAL ENERGY USE

Home energy use in Moraga represents the second largest source of GHG emissions (based on the 2005 baseline year). Residential energy use—including natural gas and electricity--produced 34% of GHG emissions. An important step in developing targeted reduction strategies involves assessing the conditions of the built environment. Most of the Town's residential neighborhoods are built out with much of Moraga's housing stock developed between 1960 and 1980. The majority of residences within Moraga are single family (roughly 82%), while the remaining 18% are multifamily dwellings. Given that the majority of Moraga's homes were built prior to the implementation of California's Building Code for Energy Efficiency (Title 24, Part 6) in 1978; bringing Moraga's housing stock up to current efficiency standards can yield significant energy savings and GHG reductions.

Residential emissions decreased by 3% between 2005 and 2010. This resulted from a decrease in electricity use (3%) even though there was a slight increase in natural gas consumption (1%). Another contributing factor to decreasing emissions is PG&E's power mix. Per the Renewable Portfolio Standards, California's investor-owned utility (IOU) energy providers, such as PG&E, are required to increase the portion of electricity generated from eligible renewable sources to 20% by 2010 and to 33% by 2020. In 2010, PG&E's power mix consisted of a higher ratio of renewable energy and greenhouse gas-free sources, helping to drive down the emissions intensity. RPS is expected to have a considerable impact on emissions from energy use in both the residential and commercial sectors. In order to reach the Town's 15% reduction goal, the community will need to reduce residential emissions by 1,263 MT of $CO_2e$.

*Moraga Glen Subdivision, Source: Town of Moraga*

## *STRATEGIES*

### EE-RC.1 Adopt a green building ordinance impacting all new construction (GBO)

**33 MT**

- Mandate all new residential and nonresidential construction to achieve CALGREEN Code (Title 24, 2010) Tier 1 or Tier 2 energy efficiency standards. All new buildings must be designed to exceed Title 24 ‘s 2008 Energy Efficiency Standard by 15% (Tier 1) or 30% (Tier 2).
- Require all newly built single family and multifamily dwellings be constructed to achieve Energy Star certification criteria as prescribed by the California Advanced Homes Program and California Multifamily New Homes, respectively.

*Implementation: Town of Moraga (Title 24, 2010), PG&E (partner)*

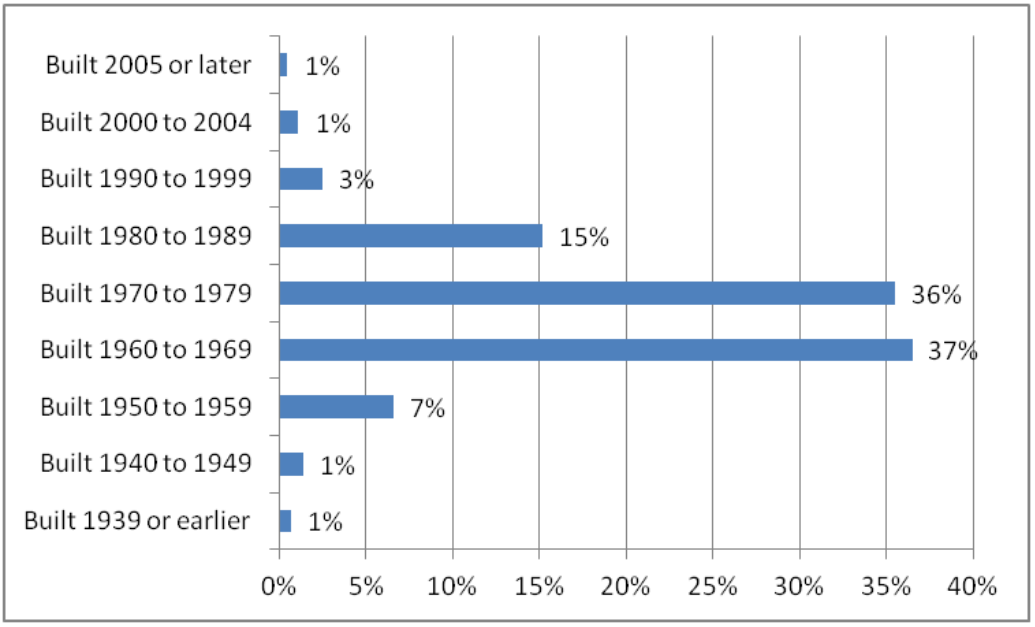
### EE-RC.2 Support upgrades of major home appliances to high-efficiency models

**20-58 MT**

- Promote utility rebate programs for high efficiency home appliances and other equipment. Distribute brochures and rebate catalogs to the community.

*Implementation: Town of Moraga (marketing, outreach), PG&E (partner)*

**Moraga’s Housing Stock**




*The majority of Moraga’s homes were built between 1960 and 1979, prior to the implementation of Title 24, Part 6 Energy Code.*

* Due to rounding, figures in the chart above are slightly greater than 100%

## EE-RC.3 Partner with energy service providers to host energy efficiency fairs, workshops, and demonstrations

- Reach out to residents and business owners through events that highlight the benefits of energy efficiency.
- Recruit local vendors and service providers to promote services, programs and rebates and demonstrate examples of energy efficiency measure saving opportunities.

*Implementation: Town of Moraga (outreach), community organizations (partner)*

## EE-RC.4 Partner with solar vendors and installers to host events where residents and business owners can directly sign up to receive analyses of their homes' solar potential

- Reach out to residents and business owners through events that highlight the benefits of self generation using renewable energy resources.
- Recruit local vendors and service providers to promote services, programs, and rebates, and demonstrate self-generation technologies and products.

*Implementation: Town of Moraga (outreach), solar vendors (partner)*

## EE-RC.5 Accelerate penetration of solar technologies by identifying individuals or organization with common energy goals or needs

- Coordinate group purchases of solar technology to access discounted prices for residents and group employees. Group-purchase participants can leverage replicable models for procurement offered by groups like SunShares and 1Block Off the Grid.

*Implementation: Town of Moraga (outreach), local government organizations, non-profit and for profit energy service providers, PG&E (partner)*

## EE-RC.6 Support development of best practices that streamline the solar permitting process

- Allocate resources to cost-effectively minimize or remove market barriers to adoption of solar PV technology, such as costs associated with solar permitting.

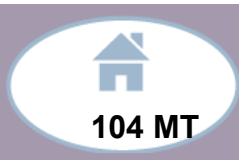
*Implementation: Town of Moraga (outreach), local government organizations, non-profit and for-profit energy service providers (partner)*

## EE-RC.7 Support the installation of solar thermal (domestic hot water) on existing buildings

- Promote programs and provide resources that enable homeowners to reduce grid-purchased energy used to heat water by installing solar water heating systems.

*Implementation: Town of Moraga (outreach), PG&E and community organizations*

## EE-R.1 Support community-wide improvements to whole-home energy performance through programs that also deliver workforce development




- Support baseline and advanced efficiency improvements to whole-home energy performance. A whole-home performance approach for single-family homes includes air sealing, attic insulation, duct sealing, hot water pipe insulation, low-flow showerheads and thermostatic shut-off valves. High-performance retrofit packages for deeper energy reductions include all strategies mentioned above and any of the following: high-efficiency furnace, energy-efficient cooling, water heating system, energy-efficient windows, duct replacement, wall insulation, or other custom strategies.

*Implementation: Town of Moraga (outreach), residential community-based organizations*

## EE-R.2 Promote energy-saving water conservation strategies for single-family and multifamily owners and renters

- Promote programs that provide rebates for energy-saving water conservation strategies, such as low-flow showerheads and faucet aerators.

*Implementation: residential community-based organizations*

*in order to avoid double counting, GHG emissions associated with this strategy have been included in WW.5.

## EE-R.3 Promote Affordable Housing Weatherization Program

- Promote the Affordable Housing Weatherization Assistance Program (WAP), a residential energy efficiency program for low-income residents.

*Implementation: Town of Moraga (outreach), Weatherization Assistance*

## EE-R.4 Promote home energy benchmarking

- Integrate voluntary green building labeling with Jurisdiction's current development/design review and permitting processes for homes.
- Request Home Energy Rating System (HERS) ratings for homes to foster awareness of energy consumption benchmarked against a statewide standard.

*Implementation: Town of Moraga (outreach), Home Energy Rating System Providers* (partner)

## EE-R.5 Consider adopting an ordinance that requires energy efficiency retrofits for homes or application for renovation or addition

- Conduct research on ordinances that require energy efficiency improvements for older homes.
- Compile a list of energy efficiency strategies, savings, and incentives specifically for older homes.

*Implementation: Town of Moraga (ordinance)*

## EE-R.6 Adopt an ordinance that requires new residential construction to be built to 'Solar Ready Homes' and/or 'Solar Oriented Development' design guidelines

- Require new single family homes to include designated roof space adequate for solar PV (photovoltaic) or SWH (solar water heating) systems.
- Require permitting plans to indicate future piping and electrical layout to accommodate future solar installations
- Work with solar vendors to obtain incentives for homeowners who install solar PV within the three years of purchasing 'Solar Ready Home'.

*Implementation: Town of Moraga (ordinance, Municipal Code)*

* These requirements have been built into the new Energy Code, CALGreen Code, 2010. Path I assumes minimum requirements are met under CALGreen Code, 2010.

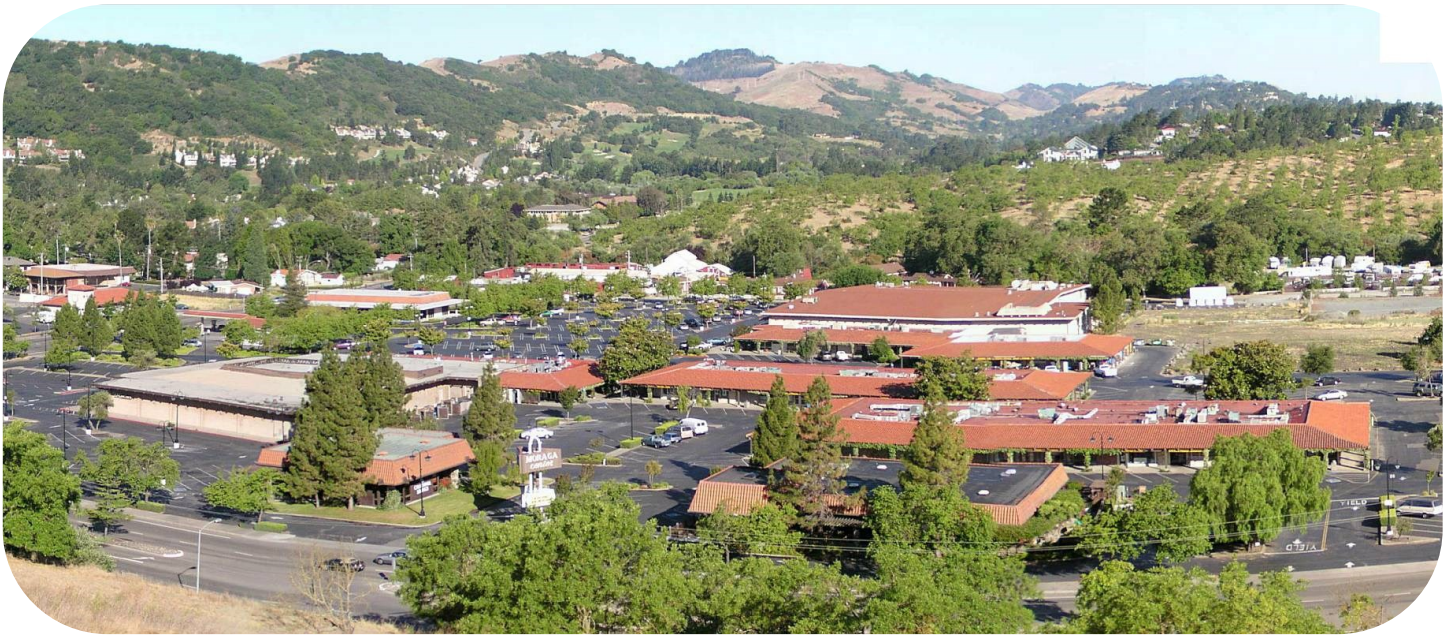
# COMMERCIAL ENERGY USE

Moraga's commercial sector prides itself on providing a diverse array of shopping and services to meet the needs of the community. This sector, broadly described as "Commercial" energy use includes all non-residential, non-municipal energy users, including retail and commercial centers, schools and St. Mary's College. The College is a major institution in Moraga and presumed to be a large energy user. Moraga does not have a significant industrial or manufacturing sector.

Roughly half of this sector's emissions came from grid electricity use (51%) while the other half came from natural gas consumption (49%). In 2005, the largest electricity users in Moraga were schools followed by retail shops. The largest natural gas consumers were schools followed by the hospitality sector. The commercial sector contributed 15% (13,900 MT of $CO_2e$) to the Town's GHG emissions in 2005.

Between 2005 and 2010, the commercial sector saw a 2.8% decrease in emissions. This decrease, however, was not the result of decreased electricity or natural gas usage which actually increased by 1% and 4%, respectively. The emissions decrease can be explained by PG&E's cleaner power mix in 2010. By 2020, emissions for this sector are projected to increase by 3% above baseline levels. Although not a huge increase, the commercial and industrial sector will need to reduce emissions by 557 MT of $CO_2e$ in order to meet Moraga's commercial and industrial portion of the overall reduction goal.

Strategies to reduce emissions in this sector involve application of energy efficiency & renewable energy. The strategies in this sector include a combination of both and are expected to reduce emissions by 120 MT $CO_2e$.



*Moraga Shopping Center; Source: Town of Moraga*

## COMMERCIAL ENERGY USE

### *STRATEGIES*

**EE-C.1 Target small and medium businesses with retrofit and rebate opportunities**

- Offer no-cost lighting and refrigeration assessments for small and medium businesses to identify energy efficiency opportunities.
- Provide marketing material with rebate information for small and medium businesses. with rebate information.

*Implementation: Town of Moraga (outreach), Chamber of Commerce, PG&E, non-profit and for-profit energy service providers (partner)*

**EE-C.2 Adopt a policy promoting regular retrocommissioning (RCx) of buildings at a regular frequency**

- Work with PG&E's retrocommissioning program and other energy service providers to align property managers with retrocommissioning services and resources. A PG&E audit is necessary to determine program eligibility.

*Implementation: Town of Moraga (ordinance, Municipal Code)*

**EE-C.3 Raise awareness about energy use in the community by coordinating an energy benchmarking campaign**

- Engage commercial property owners and occupants in a campaign designed to allow comparison of one building's energy use to others. Annual campaigns foster the spirit of competition to achieve lower Energy Use Intensity (EUI) ratings through behavioral changes or implementation of retrofits.

*Implementation: Town of Moraga (support), Chamber of Commerce (partner)*

## EE-C.4 Adopt a policy promoting regular ASHRAE audits to identify retrofit and retro-commissioning opportunities

*See Note

- Encourage commercial buildings 50,000 $ft_2$ and larger to complete an ASHRAE II audit and buildings between 10,000 $ft_2$ to 49,999 $ft_2$ to complete an ASHRAE I audit.
- Partner with energy professionals to provide a list of strategies with simple payback periods, total estimated implementation costs and energy savings if strategies are fully implemented.

*Implementation: Town of Moraga (support), Chamber of Commerce, ASHRAE (partner)*

*No GHG reductions associated with Path I. See Path II and III for GHG reductions.

## EE-C.5 Conduct targeted outreach to large commercial and industrial (LCI) utility customers to encourage greater adoption of energy efficiency

supportive

- Work between PG&E and LCI entities to improve access to audit services and utility rebates for energy efficiency improvements
- Target trade groups or businesses associations with common interests and goals
- Host meetings with relevant stakeholders to obtain feedback on their energy needs as they are related to the needs of the community.

*Implementation: Town of Moraga (support), PG&E, large commercial and industrial utility customers (partner)*

*St. Mary's College, Source: Town of Moraga*

# SOLID WASTE

For the past 25 years, the State of California has committed itself to increasingly stringent solid waste diversion goals. Through a variety of diversion programs aimed at increasing recycling, composting and source reduction, the State's current goal aims to divert 75% of solid waste by 2020.

**Assembly Bill 341, (2011)**

A mandatory recycling law requiring businesses that produce more than 4 cubic yards of solid waste per week and multifamily dwellings of 5 units or more to provide containers for recycling service. With the State's commercial sector producing approximately 64% of land filled waste, this law will be instrumental in diverting recyclable materials from landfills.

In 2005, the Town of Moraga sent 9,480 tons of solid waste to local landfills. The emissions associated with processing this waste caused 1,796 MT of $CO_2e$ emissions. Although land filled solid waste only accounted for 2% of overall emissions, potential reductions from waste diversion demonstrate a significant opportunity to reduce emissions from this sector. It is important to note that the emissions associated with this sector resulted from decomposition and Alternate Daily Cover material; they do not include emissions associated with transporting solid waste or life cycle impacts.

By 2020, emissions from this sector are projected to increase by 13% above 2005 levels, or 2,042 MT $CO_2e$, under the BAU forecast.

*Source: Contra Costa Solid Waste Authority*

Due to the predominance of residential land uses, the residential sector (single family and multifamily homes) is responsible for generating the majority of solid waste hauled to landfills. According to 2013 figures from the Central Contra Costa Solid Waste Authority (CCCSWA), residential waste made up 62% of the solid waste Moraga sent to local landfills while the commercial & industrial sector contributed 34%. Schools made up for 3%, leaving municipal operations responsible for the remaining 1 %.

In accordance with the State's solid waste goals, this CAP includes a strategy that sets out to achieve a 75% waste diversion rate by 2020. The Town plans to meet its 75% diversion goal through education programs and by increasing recycling and composting services. In order to meet Moraga's reduction goal, emissions from solid waste will need to be reduced by 72 MT of $CO_2e$. The strategies included in this Climate Action Plan are designed to reduce solid waste emissions by 962 MT of $CO_2e$.

## SOLID WASTE

### *STRATEGIES*

**SW.1 Increase landfill diversion rate of 75% by the year 2020**

- Provide publicity and education to residents and businesses with information on waste reduction, reuse, recycling and composting.
- Encourage St. Mary's College to reduce post semester landfill waste, increase reuse and recycling and continue to educate students, staff, and faculty about improved campus recycling.
- Work with waste hauler to incorporate food waste collection.

*Implementation: Town of Moraga (outreach), community-based organizations, St. Mary's College, Central Contra Costa Solid Waste Authority (partner)*

**SW.2 Adopt a mandatory recycling ordinance for multi-family and commercial properties.**

- Launch a campaign informing multi-family residents, owners and commercial property owners about the new mandatory recycling policy.
- Negotiate with local recycling hauler to increase service collection for all multi-family and commercial property.
- Consult with the CCCSWA about any updates or changes to the solid waste franchise agreement.

Implementation: Town of Moraga (support), community-based organizations, Central Contra Costa Solid Waste Authority (partner)

## SW.3 Adopt a single-use grocery bag ordinance that discourages unnecessary bag waste and places a $0.10 fee on bags*

- Work with grocery store retailers within Moraga to implement a plastic bag ban and charge $0.10 fee on other bags*.
- Launch a campaign in Moraga to increase awareness and support to discourage plastic bag use.
- Develop education material promoting the economic and environmental benefits of a plastic bag fee.

*Implementation: Town of Moraga (ordinance), community-based organizations (partner)*

* Senate Bill 270, Solid Waste: single-use carryout bags– this bill requires stores to have an at-store recycling program that provides consumers the opportunity to return clean plastic carryout bags (through 2020). An amendment to this bill was introduced in 2013. If amended this bill will prohibit stores with a specified amount of sales in dollars or retail floor space from providing a single-use carryout bag to a customer, with specified exceptions and will impose certain fees for brown paper bags and compostable bags as of July 1, 2015..

# WATER & WASTEWATER

California currently faces one of the most severe droughts in recent history. In 2014, Governor Jerry Brown declared a drought state of emergency and called for Californians to voluntarily reduce water use by 20%. With many of California's water reservoirs at historic lows, low precipitation rates and reduced snowpack, the drought threatens whole communities with water shortages and poses challenges for the agricultural industry. According to 2013 figures released by the East Bay Municipal Utility District, the residential sector is responsible for consuming the majority (75%) of water used in Moraga. The average single family home in Moraga consumed 431 gallons of water per day, which amounts to 11,391 gallons more than the national average per year. The commercial sector was responsible for 12% of water consumption, while irrigation accounted for 13% of water used in Moraga.

As the State struggles to address potential water shortages, the importance of water conservation and water efficiency becomes increasingly critical. One way to reduce water use is by improving the efficiency of outdoor irrigation, which is a significant component of residential water use. California's Model Water Efficient Landscape Ordinance (MWELO), under AB 1881 aims to reduce water consumption from landscape irrigation by requiring new landscaping to incorporate irrigation design elements and employ smart technology to increase water efficiency.

*"2013 was the driest year in recorded history for many areas in California"*

-California Department of Water Resources

*Laguna Creek, Moraga; Source: Town of Moraga*

The GHG emissions resulting from water use come from energy used to pump, transport, heat and treat water. The GHG emissions associated with water heating and transport have been accounted in each respective sector. This chapter focuses on the GHG emissions produced from wastewater treatment.

In 2005, energy used to process wastewater coming from Moraga's homes, businesses and industrial facilities caused 413 MT of $CO_2e$, making up 1% of Moraga's overall GHG emissions. By 2010, wastewater emissions increased by 3%. Emissions from wastewater can encompass many different sources such as wastewater collection and managing septic systems. It is noted that the emissions associated with wastewater in this sector are exclusively from methane ($CH_4$) and nitrous oxide ($N_2O$) created by centralized wastewater treatment. The strategies included in this CAP aim to reduce water and wastewater emissions by 56 MT of $CO_2e$.

**Assembly Bill 1881**

Under AB 1881, local agencies are required to adopt the State's MWELO or develop an ordinance that meets or exceeds the State's Ordinance by January 1, 2010. The Ordinance applies to new construction and rehabilitated landscapes for public agency projects and private development projects with a landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check or design review. The Ordinance also applies to new construction and rehabilitated landscaping projects over a certain square footage for single and multifamily residences.

The Town currently adheres to the State's MWELO. In an effort to further reduce water consumption from irrigation and landscaping, the Town of Moraga has included a strategy aimed at exceeding the State's MWELO.

## WATER AND WASTEWATER

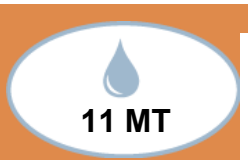
### *STRATEGIES*

**WW.1 Develop a local efficient landscape ordinance that exceeds the State's Model Water Efficient Landscape Ordinance**

- Develop a water efficient landscape worksheet and checklist documenting requirements for compliance. Consider requiring documentation of the following: soil management report, landscape design plan, irrigation design plan, grading design plan.
- Encourage residents and businesses to implement strategies that limit or eliminate the use of potable water, or other natural surface water for landscape irrigation.
- Promote outdoor landscaping strategies that maximize water savings and require minimal irrigation.

*Implementation: Town of Moraga (ordinance), East Bay Municipal Water Utility (partner)*

## WW.2 Encourage water audits on remodels, new and existing businesses, and encourage installation of water conservation fixtures




- Work with the East Bay Municipal Utility District to provide education about water conservation strategies, available programs and incentives.

## WW.3 Encourage schools and Town to use Bay Friendly Landscaping

- Work with professional landscapers to highlight best practices in landscaping and inform residents about EBMUD's lawn and irrigation upgrade rebates.
- Educate students about the environmental benefits of the Bay Friendly Landscaping design approach.

Implementation: Town of Moraga (outreach), landscapers, EBMUD (partners)

## WW.4 Encourage Low Impact Development (LID)

- Develop marketing material highlighting the benefits of Low Impact Development and best practices for storm water management.

Implementation: Town of Moraga (outreach), Contra Costa Clean Water Program (partner)

## WW.5 Adopt a retrofit program to encourage installation of water conservation strategies in new and existing homes

- Promote programs that provide rebates for energy-saving water conservation strategies, such as low-flow showerheads and faucet aerators.

Implementation: Town of Moraga (outreach)

*The Town currently adheres to the State's MWELO. In an effort to further reduce water consumption from irrigation and landscaping, the Town of Moraga has included a strategy aimed at exceeding the State's MWELO. The Town's new landscape design for the331 Rheem Blvd. community room exceeds MWELO.*

# MUNICIPAL OPERATIONS

Local governments play an important role in shaping and influencing the long term emission reduction goals of their community. Although municipal operations only account for a small fraction of total community GHG emissions—in this case 0.5%—local governments often demonstrate GHG reducing strategies and establish a GHG reduction target.

In 2005, Moraga's local government operations produced 508 MT of $CO_2e$. Changes between the GHG production for 2005 and 2010 are not reported because a municipal greenhouse gas inventory was not complete for 2010, although a community inventory was complete which included emissions from Town operations. However, based on activity data, every sector where applicable (except water delivery) saw an increase in electricity use including Buildings and Facilities, Public Lighting, and Traffic Signals and Controllers. Despite the increase in electricity consumption, emissions from Municipal Operations are expected to decrease mostly due to the impact from RPS. So even if the Town uses slightly more electricity per year, PG&E's cleaner power mix used to generate the electricity helps to offset the emissions produced.

*Moraga's vehicle fleet was responsible for the largest source of municipal emissions in 2005.*

By 2020, emissions from municipal operations are projected to decrease by 23%; this projection includes impacts from Pavley and RPS. The strategies included in this chapter are expected to decrease GHG emissions by 75 MT of $CO_2e$.

*Town Offices at 329 Rheem Boulevard, Moraga; Source: Town of Moraga*

## *STRATEGIES*

### M.1 Purchase alternative fuel or fuel-efficient vehicles

- Conduct a cost-benefit analysis on the various alternative fuel options including compressed natural gas, electric and hybrid vehicles.
- Investigate rebates, federal tax credits and financing opportunities for alternative fuel vehicles.

*Implementation: Public Works, Police Department (research, funding, purchasing policy)*

### M.2 Install renewable generation systems on Town facilities

- Complete an energy efficiency audit and solar PV audit to determine feasibility.
- Research various financing options (i.e. Power Purchase Agreements (PPA, Property Assessed Cleaner Energy (PACE) loan as well as current rebate incentives.

*Implementation: Town of Moraga (research, financial cost benefit analysis)*

### M.3 Strengthen recycling programs, purchasing policies and employee education at Town facilities.

- Conduct a waste stream audit to assess waste composition and improve recycling practices.
- Review Town's purchasing policy and incorporate an efficiency standard when purchasing products or new equipment.

*Implementation: Town of Moraga (purchasing policy)*

*Hacienda de las Flores (La Hacienda)*

## M.4 Adopt a policy that requires retro commissioning of municipal building systems at regular frequencies.

**2-4 MT**

- Perform retro commissioning to determine if heating, ventilation, and air conditioning equipment are performing as they were designed. Work with MIT and other vendors and industry experts to implement RCx in its facilities.

*Implementation: Town of Moraga (support), Municipal Implementation Team (implementation)*

## M.5 Adopt an Energy Efficient Procurement Policy for major building system equipment

**6 MT**

- Establish guidelines for all municipal buildings when installing new equipment and regularly update procurement policies to reflect current energy efficiency standards.

*Implementation: Town of Moraga (procurement policy)*

# CONCLUSION

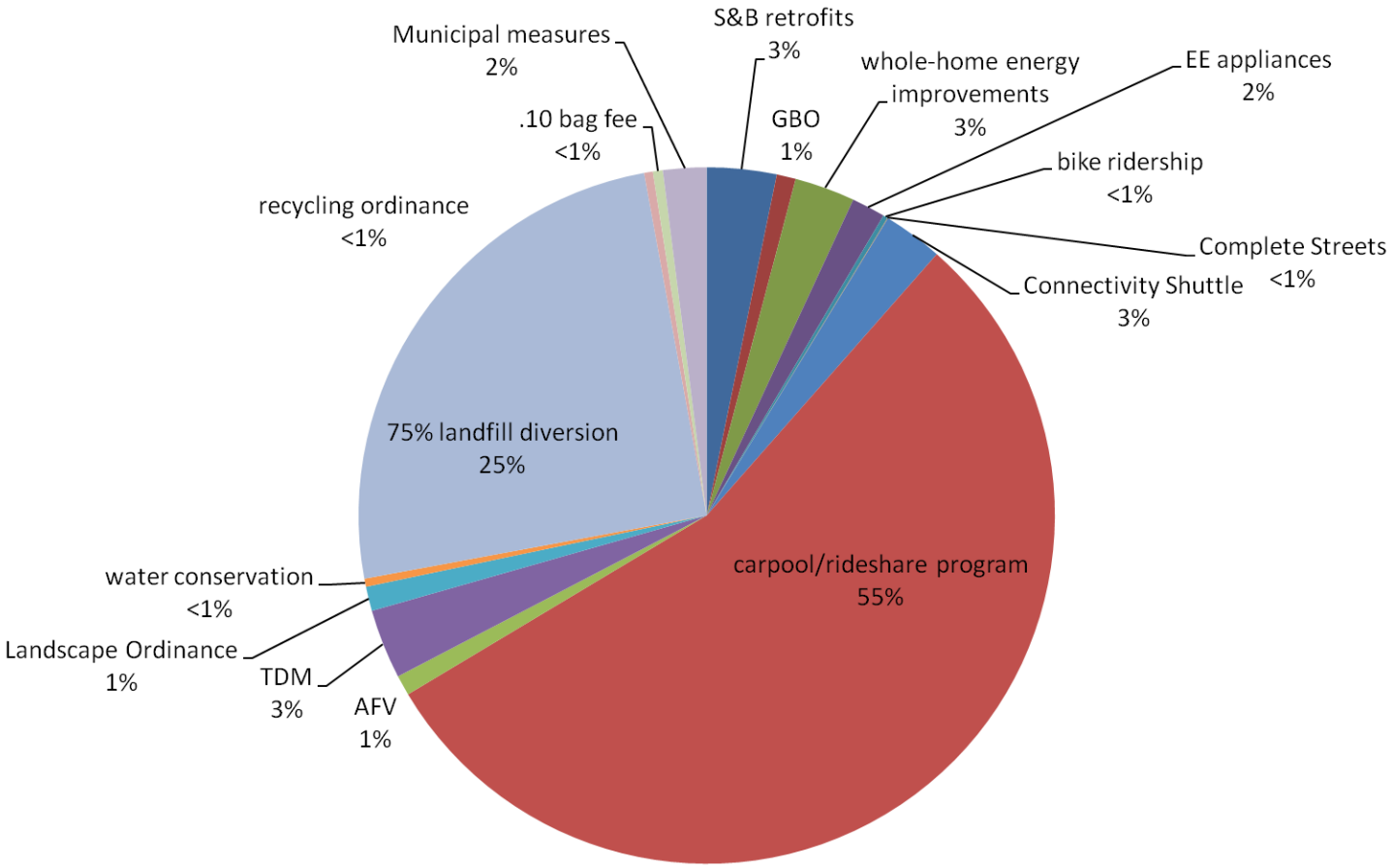
Local governments are often tasked with developing and implementing a CAP from start to finish. From adopting a community ordinance to hosting a public workshop, local governments may take on a number of different roles. Once a CAP has been completed, local governments are typically responsible for monitoring progress as well. This involves conducting a community and municipal greenhouse gas inventory, overseeing the implementation of strategies and engaging the community.

This CAP is intended to be consistent and complimentary to the community's values and principles of preserving the natural landscape, creating a greater sense of community, supporting traffic congestion relief, and preserving the quality of its residential neighborhoods. By using its resources more efficiently, Moraga's community will benefit from cleaner air, increased physical activity and a preserved natural environment. The Town of Moraga has joined other cities, towns and counties throughout the State of California in developing its own CAP. This CAP offers a roadmap for Moraga's residents, businesses and local government to take direct action on the issues relating to climate change in Moraga. From individual actions to community-supported legislation, every effort to mitigate GHG emissions is a necessary and vital step toward helping Moraga reach its 15% reduction goal by 2020.

*Source: Town of Moraga*

# IMPACT OF CAP STRATEGIES

**Total Anticipated GHG Reductions from Proposed CAP Strategies (%)**




The chart above represents reductions from all quantified strategies under Path I. The strategies with the largest impact on emissions included carpool/rideshare program, residential energy efficiency and landfill diversion. Accounting for 55% of emission reductions, the carpool/rideshare program has the largest potential to reduce the Town's emissions based on the strategies selected. This strategy assumes a 20% increase in the number of vehicles participating in carpool/ridesharing. One of the reasons this strategy has the largest GHG reductions is because it effectively reduces vehicle miles traveled per person.

The combination of all of the quantified strategies listed in the chart above is projected to reduce the Town's emissions by 3,582 to 3,716 MT CO2e under Path I. As with all projections there is an anticipated range in the amount of MT CO2e that would be reduced. This reduction, at the higher end of the range, is enough to meet Moraga's 15% reduction goal exactly (after reductions from State legislation) if fully implemented and all strategies perform as expected. Reductions assuming higher rates of participation and implementation under Path II and Path III are estimated to reduce emissions by 4,207 to 4,493 and 5,193 to 5,615 MT CO2e respectively.

# PATH I STRATEGIES

| Energy Strategies | | | | | |
|---|---|---|---|---|---|
| **Strategy Number** | **Strategy Description** | **Sector Targeted** | **kWh Savings** | **Therms Savings** | **MT CO2e savings** |
| EE-C.1 | Target small and medium businesses with retrofit and rebate opportunities | Commercial | 134,304-588,864 | n/a | 27-120 |
| EE-C.2 | Adopt a policy promoting regular retro commissioning (RCx) audits of buildings at a regular frequency | Commercial | Supportive | | |
| EE-C.3 | Raise awareness about energy use in the community by coordinating an energy benchmarking campaign | Commercial | Supportive | | |
| EE-C.4 | Adopt a policy promoting regular ASHRAE audit to identify retrofit and retro commissioning opportunities | Commercial | n/a | n/a | n/a |
| EE-C.5 | Conduct targeted outreach to large commercial and industrial (LCI) utility customers to encourage greater adoption of energy | Commercial | Supportive | | |
| EE-RC.1 | Adopt a green building ordinance impacting all new construction | Residential & Commercial | 105,823 | 2,250 | 33 |
| EE-RC.2 | Support upgrades of major home appliances to high-efficiency models | Residential | 101,520-282,000 | n/a | 20-58 |
| EE-RC.3 | Partner with energy service providers to host energy efficiency fairs, workshops, and demonstrations | Residential & Commercial | Supportive | | |
| EE-RC.4 | Partner with solar vendors and installers to host events where residents and business owners can directly sign up to receive analyses of their homes' and businesses' solar potential | Residential & Commercial | Supportive | | |
| EE-RC.5 | Accelerate the penetration of solar technologies by identifying individuals or organizations with common energy goals or needs | Residential & Commercial | Supportive | | |
| EE-RC.6 | Support development of best practices that streamline the solar permitting process | Residential & Commercial | Supportive | | |
| EE-RC.7 | Support the installation of solar thermal (domestic hot water) on existing buildings | Residential & Commercial | Supportive | | |
| EE-R.1 | Support community-wide improvements to whole-home energy performance through programs that also deliver workforce development | Residential | 52,474-55,768 | 17,642-18,725 | 104 |
| EE-R.2 | Promote energy-saving water conservation measures for single family and multifamily owners and renters | Residential | Included in savings from WW.5 | | |
| EE-R.3 | Promote Affordable Housing Weatherization program | Residential | Supportive | | |
| EE-R.4 | Promote comprehensive, whole-home efficiency retrofits | Residential | Supportive | | |
| EE-R.5 | Consider adopting an ordinance that requires energy efficiency retrofits for homes or application for renovation or addition permit | Residential | Supportive | | |
| EE-R.6 | Adopt an ordinance that requires new residential construction to be built to 'Solar Ready Homes' and/or 'Solar Oriented Development' design guidelines | Residential | n/a | n/a | n/a |
| Subtotal GHG emission reductions | | | | | 184-315 |

# PATH I STRATEGIES

| Transportation Strategies | | | | | |
|---|---|---|---|---|---|
| **Strategy Number** | **Strategy Description** | **Sector Targeted** | **Saturation** | **VMT reduction** | **MT CO2e savings** |
| LU&T.1 | Increase bike ridership in Moraga by 5% or better Path I: 5% increase over current bike ridership | Transportation | n/a | 18,835 | 8 |
| LU&T.2 | Complete Moraga's Streets and improve bicycle and pedestrian facilities through road design improvements | Transportation | 5% increase in pedestrian trips | | 1 |
| LU&T.3 | Achieve a 10% reduction in car trips to school or better* | Transportation | 10% reduction in VMT | 114,551 | 48 |
| LU&T.4 | Support Lamorinda's Connectivity Shuttle program | Transportation | Shuttle frequency: one trip/hour | | 103 |
| LU&T.5 | Work with CCTA to implement a carpool/rideshare program | Transportation | Increase rideshare by 20% | | 2,041 |
| LU&T.6 | Support the transition to hybrids and alternative fuel vehicles | Transportation | 10% of all prewired homes have PEV's | | 35 |
| LU&T.7 | Increase employer participation in Transportation Demand Management programs | Transportation | 1% of employees | | 120 |
| Subtotal GHG emission reductions | | | | | 2,308 |

| Water and Wastewater | | | | | |
|---|---|---|---|---|---|
| **Strategy Number** | **Strategy Description** | **Sector Targeted** | | **Gallons of Water Reduced** | **MT CO2** |
| WW.1 | Develop a local water efficient landscape ordinance that exceeds the State's Model Water Efficient Landscape Ordinance (MWELO) | Water & Wastewater | Outdoor | 38,626,467 | 42 |
| WW.2 | Encourage water audits on remodels, new and existing businesses, and encourage installation of water conservation measures | Water & Wastewater | Indoor | 10,666,483 | 11 |
| WW.3 | Encourage the schools and Town to use Bay Friendly Landscaping | Water & Wastewater | Supportive | | |
| WW.4 | Encourage Low Impact Development (LID) | Water & Wastewater | Supportive | | |
| WW.5 | Adopt a retrofit program to encourage installation of water conservation measures in existing businesses | Water & Wastewater | Indoor | 3,339,872 | 3 |
| Subtotal GHG emission reductions | | | | | 56 |

# PATH I STRATEGIES

| Solid Waste | | | | | |
|---|---|---|---|---|---|
| Strategy Number | Strategy Description | Sector Targeted | Saturation | Reduction in Waste Lanfilled (short tons) | MT CO2 |
| SW.1 | Increase landfill diversion rate of 75% by the year 2020 | Solid Waste | 75% diversion | 5,128 | 930 |
| SW.2 | Adopt a mandatory recycling ordinance for multifamily and commercial property | Solid Waste | Multifamily & Commercial | | 15 |
| SW.3 | Adopt a single-use bag ordinance that discourages unnecessary bag waste and places a $0.10 fee on bags | Solid Waste | n/a | n/a | 17 |
| Subtotal GHG emission reductions | | | | | 962 |

| Municipal Operations | | | | | |
|---|---|---|---|---|---|
| | | | kWh Savings | Therm Savings | MT CO2 |
| M.1 | Purchase alternative fuel or fuel-efficient vehicles | Municipal | Natural Gas | | 62 |
| M.2 | Install renewable generation systems on Town facilities | Municipal | 9,862 | n/a | 2 |
| M.3 | Strengthen recycling programs purchasing policies and employee education at Town facilities | Municipal | Supportive | | |
| M.4 | Adopt a policy that requires annual benchmarking of municipal facilities | Municipal | Supportive | | |
| M.5 | Adopt a policy that requires retro commissioning of municipal building systems at regular frequencies | Municipal | 6,500-13,000 | 145-290 | 2-4 |
| M.6 | Adopt an Energy Efficient Procurement Policy for major building system equipment | Municipal | 3,050 | 100 | 6 |
| Subtotal GHG emission reductions | | | | | 72-75 |

*The combination of strategies listed under Path I (high) achieve Moraga's 15% reduction goal.*

| | |
|---|---|
| **Total $MTCO_2e$ Low** | **3,582** |
| **Total $MTCO_2e$ High** | **3,716** |

| | |
|---|---|
| **Moraga's 15% GHG Reduction Goal ($MTCO_2e$)** | **3,716** |

# PATH II STRATEGIES

| Energy Strategies | | | | | |
|---|---|---|---|---|---|
| **Strategy Number** | **Strategy Description** | **Sector Targeted** | **kWh Savings** | **Therms Savings** | **MT CO2e** |
| EE-C.1 | Target small and medium businesses with retrofit and rebate opportunities | Commercial | 265,810-1,164,460 | n/a | 54-237 |
| EE-C.2 | Adopt a policy promoting regular retro commissioning (RCx) audits of buildings at a regular frequency | Commercial | Supportive | | |
| EE-C.3 | Raise awareness about energy use in the community by coordinating an energy benchmarking campaign | Commercial | Supportive | | |
| EE-C.4 | Adopt a policy promoting regular ASHRAE audit to identify retrofit and retro commissioning opportunities | Commercial | 318,743 | 7,110 | 103 |
| EE-C.5 | Conduct targeted outreach to large commercial and industrial (LCI) utility customers to encourage greater adoption of energy | Commercial | Supportive | | |
| EE-RC.1 | Adopt a green building ordinance impacting all new construction (GBO) | Multiple | 440,255 | 20,005 | 196 |
| EE-RC.2 | Support upgrades of major home appliances to high-efficiency models | Residential | 203,040-564,000 | n/a | 40-115 |
| EE-RC.3 | Partner with energy service providers to host energy efficiency fairs, workshops, and demonstrations | Residential & Commercial | Supportive | | |
| EE-RC.4 | Partner with solar vendors and installers to host events where residents and business owners can directly sign up to receive analyses of their homes' and businesses' solar potential | Residential & Commercial | Supportive | | |
| EE-RC.5 | Accelerate the penetration of solar technologies by identifying individuals or organizations with common energy goals or needs | Residential & Commercial | Supportive | | |
| EE-RC.6 | Support development of best practices that streamline the solar permitting process | Residential & Comr | Supportive | | |
| EE-RC.7 | Support the installation of solar thermal (domestic hot water) on existing buildings | Residential & Commercial | Supportive | | |
| EE-R.1 | Support community-wide improvements to whole-home energy performance through programs that also deliver workforce development | Residential | 104,949-111,537 | 35,284-37,450 | 208 |
| EE-R.2 | Promote energy-saving water conservation measures for single family and multifamily owners and renters | Residential | Included in savings from WW.5 | | |
| EE-R.3 | Promote Affordable Housing Weatherization program | Residential | Supportive | | |
| EE-R.4 | Promote comprehensive, whole-home efficiency retrofits | Residential | Supportive | | |
| EE-R.5 | Consider adopting an ordinance that requires energy efficiency retrofits for homes or application for renovation or addition permit | Residential | Supportive | | |
| EE-R.6 | Adopt an ordinance that requires new residential construction to be built to 'Solar Ready Homes' and/or 'Solar Oriented Development' design guidelines | Residential | 84,672 | 7,800 | 17-41 |
| Subtotal GHG emission reductions | | | | | 618-900 |

# PATH II STRATEGIES

| Transportation Strategies | | | | | |
|---|---|---|---|---|---|
| **Strategy Number** | **Strategy Description** | **Sector Targeted** | **Saturation** | **VMT reduction** | **MT CO2e** |
| LU&T.1 | Increase bike ridership in Moraga by 5% or better Path I: 5% increase over current bike ridership | Transportation | n/a | 46,277 | 19 |
| LU&T.2 | Complete Moraga's Streets and improve bicycle and pedestrian facilities through road design improvements | Transportation | 12.5% increase in pedestrian trips | | 3 |
| LU&T.3 | Achieve a 10% reduction in car trips to school or better | Transportation | 15% reduction in VMT | 171,826 | 73 |
| LU&T.4 | Support LaMorinda's Connectivity Shuttle program | Transportation | Shuttle frequency: two trips/hr | | 168 |
| LU&T.5 | Work with CCTA to implement a carpool/rideshare program | Transportation | Increase rideshare by 20% | | 2,041 |
| LU&T.6 | Support the transition to hybrids and alternative fuel vehicles | Transportation | 25% of all prewired homes have PEV's | | 89 |
| LU&T.7 | Increase employer participation in Transportation Demand Management programs | Transportation | 2% of employees | | 249 |
| Subtotal GHG emission reductions | | | | | 2,731 |

| Water and Wastewater | | | | | |
|---|---|---|---|---|---|
| **Strategy Number** | **Strategy Description** | **Sector Targeted** | **Gallons of Water Reduced** | | **MT CO2** |
| WW.1 | Develop a local water efficient landscape ordinance that exceeds the State's Model Water Efficient Landscape Ordinance (MWELO) | Water & Wastewater | Outdoor | 57,939,700 | 63 |
| WW.2 | Encourage water audits on remodels, new and existing businesses, and encourage installation of water conservation measures | Water & Wastewater | Indoor | 15,999,724 | 17 |
| WW.3 | Encourage the schools and Town to use Bay Friendly Landscaping | Water & Wastewater | Supportive | | |
| WW.4 | Encourage Low Impact Development (LID) | Water & Wastewater | Supportive | | |
| WW.5 | Adopt a retrofit program to encourage installation of water conservation measures in existing homes | Water & Wastewater | Indoor | 6,679,743 | 7 |
| Subtotal GHG emission reductions | | | | | 87 |

# PATH II STRATEGIES

| Solid Waste | | | | | |
|---|---|---|---|---|---|
| **Strategy Number** | **Strategy Description** | **Sector Targeted** | **Saturation** | **Reduction in Waste Lanfilled (short tons)** | **MT CO2** |
| SW.1 | Increase landfill diversion rate of 75% by the year 2020 | Solid Waste | 75% diversion | 5,128 | 930 |
| SW.2 | Adopt a mandatory recycling ordinance for multifamily and commercial property | Solid Waste | Multifamily and Commercial | | 15 |
| SW.3 | Adopt a single-use bag ordinance that discourages unnecessary bag waste and places a $0.10 fee on bags | Solid Waste | n/a | n/a | 17 |
| Subtotal GHG emission reductions | | | | | 962 |

| Municipal Operations | | | | | |
|---|---|---|---|---|---|
| | | | **kWh Savings** | **Therm Savings** | **MT CO2** |
| M.1 | Purchase alternative fuel or fuel-efficient vehicles | Municipal | Hybrid | | 76 |
| M.2 | Install renewable generation systems on Town facilities | Municipal | 19,724 | n/a | 4 |
| M.3 | Strengthen recycling programs purchasing policies and employee education at Town facilities | Municipal | Supportive | | |
| M.4 | Adopt a policy that requires annual benchmarking of municipal facilities | Municipal | Supportive | | |
| M.5 | Adopt a policy that requires retro commissioning of municipal building systems at regular frequencies | Municipal | 13,000-26,000 | 290-580 | 4-8 |
| M.6 | Adopt an Energy Efficient Procurement Policy for major building system equipment | Municipal | 6,100 | 200 | 12 |
| Subtotal GHG emission reductions | | | | | 96-100 |

*The combination of strategies listed under Path II surpass Moraga's 15% reduction goal.*

| | |
|---|---|
| **Total $MTCO_2e$ Low** | **4,494** |
| **Total $MTCO_2e$ High** | **4,780** |

| | |
|---|---|
| **Moraga's 15% GHG Reduction Goal ($MTCO_2e$)** | **3,716** |

# PATH III STRATEGIES

| Energy Strategies | | | | | |
|---|---|---|---|---|---|
| **Strategy Number** | **Strategy Description** | **Sector Targeted** | **kWh Savings** | **Therms Savings** | **MT CO2e** |
| EE-C.1 | Target small and medium businesses with retrofit and rebate opportunities | Commercial | 400,114-1,754,324 | n/a | 82-357 |
| EE-C.2 | Adopt a policy promoting regular retro commissioning (RCx) audits of buildings at a regular frequency | Commercial | Supportive | | |
| EE-C.3 | Raise awareness about energy use in the community by coordinating an energy benchmarking campaign | Commercial | Supportive | | |
| EE-C.4 | Adopt a policy promoting regular ASHRAE audit to identify retrofit and retro commissioning opportunities | Commercial | 634,317 | 14,150 | 204 |
| EE-C.5 | Conduct targeted outreach to large commercial and industrial (LCI) utility customers to encourage greater adoption of energy | Commercial | Supportive | | |
| EE-RC.1 | Adopt a green building ordinance impacting all new construction (GBO) | Residential & Commercial | 880,509 | 40,010 | 392 |
| EE-RC.2 | Support upgrades of major home appliances to high-efficiency models | Residential | 304,560-846,000 | n/a | 61-173 |
| EE-RC.3 | Partner with energy service providers to host energy efficiency fairs, workshops, and demonstrations | Residential & Commercial | Supportive | | |
| EE-RC.4 | Partner with solar vendors and installers to host events where residents and business owners can directly sign up to receive analyses of their homes' and businesses' solar potential | Residential & Commercial | Supportive | | |
| EE-RC.5 | Accelerate the penetration of solar technologies by identifying individuals or organizations with common energy goals or needs | Residential & Commercial | Supportive | | |
| EE-RC.6 | Support development of best practices that streamline the solar permitting process | Residential & Commercial | Supportive | | |
| EE-RC.7 | Support the installation of solar thermal (domestic hot water) on existing buildings | Residential & Commercial | | | |
| EE-R.1 | Support community-wide improvements to whole-home energy performance through programs that also deliver workforce development | Residential | 256,282-278,842 | 88,210-93,624 | 521 |
| EE-R.2 | Promote energy-saving water conservation measures for single family and multifamily owners and renters | Residential | Included in savings from WW.5 | | |
| EE-R.3 | Promote Affordable Housing Weatherization program | Residential | Supportive | | |
| EE-R.4 | Promote comprehensive, whole-home efficiency retrofits | Residential | Supportive | | |
| EE-R.5 | Consider adopting an ordinance that requires energy efficiency retrofits for homes or application for renovation or addition permit | Residential | Supportive | | |
| EE-R.6 | Adopt an ordinance that requires new residential construction to be built to 'Solar Ready Homes' and/or 'Solar Oriented Development' design guidelines | Residential | 84,672 | 7,800 | 17-41 |
| | Subtotal GHG emission reductions | | | | 1,277-1,688 |

# PATH III STRATEGIES

| Transportation Strategies | | | | | |
|---|---|---|---|---|---|
| **Strategy Number** | **Strategy Description** | **Sector Targeted** | **Saturation** | **VMT reduction** | **MT CO2e** |
| LU&T.1 | Increase bike ridership in Moraga by 5% or better Path I: 5% increase over current bike ridership | Transportation | n/a | 92,554 | 39 |
| LU&T.2 | Complete Moraga's Streets and improve bicycle and pedestrian facilities through road design improvements | Transportation | 25% increase in pedestrian trips | | 6 |
| LU&T.3 | Achieve a 10% reduction in car trips to school or better | Transportation | 20% reduction in VMT | 229,102 | 97 |
| LU&T.4 | Support LaMorinda's Connectivity Shuttle program | Transportation | Shuttle frequency: three trips/hour | | 234 |
| LU&T.5 | Work with CCTA to implement a carpool/rideshare program | Transportation | Increase rideshare by 20% | | 2,041 |
| LU&T.6 | Support the transition to hybrids and alternative fuel vehicles | Transportation | 50% of all prewired homes have PEV's | | 179 |
| LU&T.7 | Increase employer participation in Transportation Demand Management programs | Transportation | 3% of employees | | 374 |
| Subtotal GHG emission reductions | | | | | 3,149 |

| Water and Wastewater | | | | | |
|---|---|---|---|---|---|
| **Strategy Number** | **Strategy Description** | **Sector Targeted** | **Gallons of Water Reduced** | | **MT CO2** |
| WW.1 | Develop a local water efficient landscape ordinance that exceeds the State's Model Water Efficient Landscape Ordinance (MWELO) | Water & Wastewater | Outdoor | 77,252,934 | 84 |
| WW.2 | Encourage water audits on remodels, new and existing businesses, and encourage installation of water conservation measures | Water & Wastewater | Indoor | 21,332,966 | 23 |
| WW.3 | Encourage the schools and Town to use Bay Friendly Landscaping | Water & Wastewater | Supportive | | |
| WW.4 | Encourage Low Impact Development (LID) | Water & Wastewater | Supportive | | |
| WW.5 | Adopt a retrofit program to encourage installation of water conservation measures in existing homes | Water & Wastewater | Indoor | 10,019,615 | 11 |
| Subtotal GHG emission reductions | | | | | 118 |

# PATH III STRATEGIES

| Solid Waste | | | | | |
|---|---|---|---|---|---|
| **Strategy Number** | **Strategy Description** | **Sector Targeted** | **Saturation** | **Reduction in Waste Landfilled (short tons)** | **MT CO2** |
| SW.1 | Increase landfill diversion rate of 75% by the year 2020 | Solid Waste | 75% diversion | 5,128 | 930 |
| SW.2 | Adopt a mandatory recycling ordinance for multifamily and commercial property | Solid Waste | Multifamily and Commercial | | 15 |
| SW.3 | Adopt a single-use bag ordinance that discourages unnecessary bag waste and places a $0.10 fee on bags | Solid Waste | n/a | n/a | 17 |
| Subtotal GHG emission reductions | | | | | 962 |

| Municipal Operations | | | | | |
|---|---|---|---|---|---|
| | | | **kWh Savings** | **Therm Savings** | **MT CO2** |
| M.1 | Purchase alternative fuel or fuel-efficient vehicles | Municipal | Electric | | 104 |
| M.2 | Install renewable generation systems on Town facilities | Municipal | 29,586 | n/a | 6 |
| M.3 | Strengthen recycling programs purchasing policies and employee education at Town facilities | Municipal | Supportive | | |
| M.4 | Adopt a policy that requires annual benchmarking of municipal facilities | Municipal | Supportive | | |
| M.5 | Adopt a policy that requires retro commissioning of municipal building systems at regular frequencies | Municipal | 32,500-65,000 | 725-1,450 | 10-21 |
| M.6 | Adopt an Energy Efficient Procurement Policy for major building system equipment | Municipal | 15,250 | 500 | 30 |
| Subtotal GHG emission reductions | | | | | 150-161 |

*The combination of strategies listed under Path III surpass Moraga's 15% reduction goal.*

| | |
|---|---|
| **Total $MTCO_2e$ Low** | **5,656** |
| **Total MTCO2e High** | **6,078** |

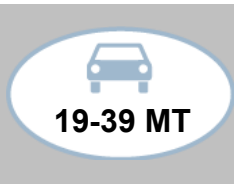
| | |
|---|---|
| **Moraga's 15% GHG Reduction** | **3,716** |

# ALTERNATE & ENHANCED STRATEGIES

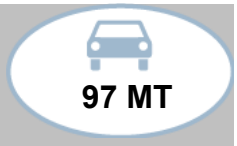
The 'Alternate and Enhanced Strategies' section consists of strategies that were additionally recommended by the Task Force or achieve greater GHG reductions through more stringent standards. The strategies listed below are optional and provide an alternative should the Town wish to pursue higher GHG reductions in a particular sector. The GHG emission reductions associated with each of these strategies have not been included in the total GHG reductions from the proposed CAP strategies listed on page 36.

## *TRANSPORTATION*

- Increase bike ridership in Moraga to reach participation levels between 0.5% and 1% of the population

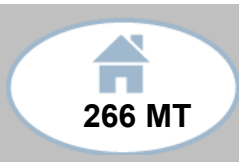



- Achieve a 20% reduction in car trips to schools




## *RESIDENTIAL ENERGY*

- Improve access to and participation in voluntary residential energy efficiency programs.




- Promote the adoption of solar power on new and existing residential buildings

* GHG emissions for the strategy above have already been included with the residential strategy above.

# ALTERNATE & ENHANCED STRATEGIES

### *COMMERCIAL AND INDUSTRIAL ENERGY*

- Promote the adoption of solar power on new and existing commercial buildings.

### *WATER AND WASTEWATER*

- Adopt a retrofit program to encourage installation of water conservation strategies in existing businesses and reduces indoor commercial water use by 20%.